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I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the degree of Doctor of Philosophy in Technology Management.

A handwritten signature in dark ink, appearing to read 'Mohd. Ghani', is written over a horizontal line.

(Supervisor's Signature)

Full Name : MOHD.GHANI BIN AWANG

Position : ASSOCIATE PROFESSOR

Date : 16/10/17



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I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Malaysia Pahang or any other institutions.

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(Student's Signature)

Full Name : MD NOH AB. MAJID

ID Number : PPT09010

Date : 16 October 2017



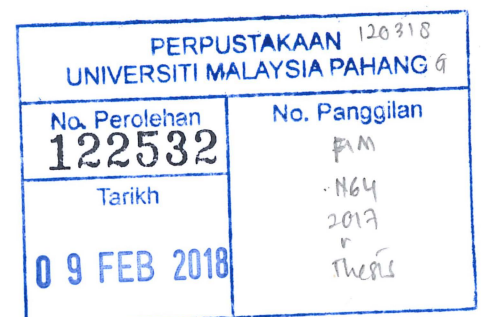
DETERMINANTS AND OUTCOMES FIRM STATE OF INNOVATIVENESS IN  
MALAYSIAN SERVICE SECTOR: A STUDY ON KNOWLEDGE-INTENSIVE  
BUSINESS SERVICES FIRM

MD NOH BIN AB. MAJID

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for the award of the degree of  
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## ABSTRAK

Banyak firma di Malaysia khususnya firma perkhidmatan dilaporkan masih tercicir dari segi kecenderungan terhadap inovasi berbanding firma pembuatan. Kajian ini dilakukan untuk meneroka faktor-faktor utama yang membentuk kecenderungan firma perkhidmatan perundingan (KIBS) terhadap inovasi yang mempengaruhi prestasi operasi mereka. Oleh kerana firma seperti ini diakui sebagai agen inovasi, maka keupayaan inovasi dalam kalangan firma tempatan boleh dikaitkan dengan prestasi syarikat perundingan seperti ini. Berpandukan '*resource-base view*', '*knowledge-base view*' dan '*knowledge-based theory of inter-firm collaboration*' satu kajian rentas secara kaji selidik persampelan lapangan telah dibuat ke atas 200 firma KIBS, yang bertujuan untuk menilai empat faktor penyebab kecenderungan firma terhadap inovasi, yang terdiri daripada budaya inovasi, struktur organisasi, perilaku keusahawanan dan jaringan kerjasama dengan firma luar. Seterusnya pengkaji akan mengkaji bagaimana kecenderungan inovasi ini mempengaruhi prestasi KIBS. Analisis data dilakukan dengan menggunakan perisian '*structural equation modeling (SEM) partial least square software*' (SmartPLS Ver. 2.0.M3). Dapatan kajian menunjukkan terdapat hubungan yang signifikan di antara semua pembolehubah bebas dengan pembolehubah bersandar yang dapat menyokong semua hipotesis yang dibuat. Semua faktor kecenderungan inovasi juga adalah konsisten di antara dua jenis firma utama KIBS yang dikaji. Perilaku keusahawanan dalam kalangan staf profesional didapati menjadi faktor paling mempengaruhi kecenderungan firma terhadap inovasi. Keupayaan inovasi serta integrasi firma KIBS bersama pelanggan mereka didapati menjalinkan sebahagian daripada pengaruh kecenderungan terhadap inovasi ke atas prestasi syarikat. Namun, didapati nisbah kakitangan KIBS berkelulusan universiti tidak mempengaruhi kecenderungan firma terhadap inovasi. Saiz dan usia firma serta maklumat luaran juga didapati tidak memberikan apa-apa kesan terhadap kecenderungan inovasi firma. Dimensi '*adhocracy*' yang merupakan salah satu daripada dimensi budaya firma didapati menjadi faktor yang paling kuat membentuk budaya inovasi dalam KIBS. Kedua-dua faktor keusahawanan korporat dan perilaku inovatif secara bersama boleh membentuk perilaku keusahawanan dalam KIBS. Integrasi sesama staf antara jabatan merupakan dimensi utama dalam faktor struktur organisasi yang memudahkan lagi proses inovasi. Faktor jaringan kerjasama dengan firma luar yang paling mempengaruhi kecenderungan inovasi didapati terhasil daripada kerjasama antara KIBS dengan makmal komersial atau institusi penyelidikan dan pembangunan swasta. Secara amnya teori '*resource-base view*', dan '*knowledge-based theory of inter-firm collaboration*' adalah disokong di dalam kajian ini. Namun, teori '*knowledge-base view*' gagal dibuktikan dengan sepenuhnya terhadap semua pembolehubah yang berkaitan pengetahuan. Implikasi metodologi juga dibincangkan dan beberapa cadangan penambahbaikan untuk kajian masa depan juga dikemukakan.

## ABSTRACT

Many Malaysian firms, particularly firms in the service sector are reported to be lagging behind the manufacturing in terms of productivity growth and outputs, which imply the lack of innovativeness. This research explores the key determinants of firm innovativeness affecting the performance of the knowledge-intensive business services (KIBS). These firms serve as an agent for innovation and the lack of innovative performance among firms in Malaysia in a way can be attributed to KIBS innovativeness. Applying the resource-based view, knowledge-based view and knowledge-based theory of inter-firm collaboration, a cross-sectional sample survey field study on 200 KIBS firms was undertaken to investigate four determinants of firm's innovativeness namely its culture, firm's design, entrepreneurial behaviors and network collaboration strategies; and this study further examined how firm's innovativeness affects their business performance. A partial-least square structural equation modeling (PLS-SEM) software (i.e. SmartPLS Ver. 2.0.M3) was applied for data analysis. The results showed that all hypothesized structural relationships are well substantiated and all determinants of firm's innovativeness are consistent across two major KIBS typologies. Entrepreneurial behavior among professional staffs is found to be the key determinant for KIBS innovativeness. Innovative capabilities and client integration are found to partially mediate firm's innovativeness and performance relationship. Contrary to the previous belief, a relatively higher proportion of university graduates in KIBS would not increase firm's innovativeness. Firm's size, age, and external information are also found not affecting the firm's innovativeness. The results further demonstrated that adhocracy culture as one of the four dimensions of firm's culture hence conveys the greatest role in shaping an innovative culture in KIBS. Corporate entrepreneurship and innovative behavior (or intrapreneurship) equally governs entrepreneurial behavior in KIBS. Functional integration among inter-departmental staff helps to facilitate firm's design (structure) that promotes innovativeness. Network collaboration is found to be chiefly shaped by KIBS collaborative strategy with commercial labs or private research and development institutions. The general resource-based and the knowledge-based theory of inter-firm collaboration are fully supported in this study. However the specific knowledge-based theory of firm employed to substantiate the role of knowledge as the underpinning theory of firm innovativeness failed to provide full support. Methodological implications are discussed and several improvements for future research are recommended.



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## LIST OF SYMBOLS

$\bar{x}$	Mean
$c$	Total effect
$c'$	Direct effect
$f^2$	Effect size
$q^2$	Relative impact
$N$	Bootstrap sample size
$p$	Significant level
$p_c$	Composite reliability
$Q^2$	Predictive relevance
$r$	Pearson correlation
$R^2$	R-Square
$\chi^2$	Chi-square
$\alpha$	Cronbach's alpha
$\beta$	Beta value



## LIST OF ABBREVIATIONS

10 <sup>th</sup> MP	Tenth Malaysia Plan
ACEM	The Association of Consulting Engineers Malaysia
AVE	Average variance extracted
B2B	Business-to-business
CB-SEM	Covariance-based SEM
CFA	Confirmatory factor analyses
CI	Confident interval
CLI	Cognitive laboratory interviews
CR	Composite reliability
CVF	Competing values framework
DI	Diffusion of innovation
DV	Dependent variable
EPS	Earnings per share
GDP	Gross domestic product
GLM	General linear modeling
GNP	Gross national product
GoF	Global Fit
ISIC	International Standard Industrial Classification of All Economic Activities
IV	Independent variable
IWB	Innovative work behavior
KBV	Knowledge-based view
KIBS	Knowledge-intensive business service
k-SME	Knowledge-intensive small and medium enterprise
LV	Latent variable
MATRADE	Malaysian External Trade Development Corporation
MIA	Malaysian Institute of Accountant
MSIC	Malaysian Standard Industrial Classification
NACE	Nomenclature générale des Activités économiques dans les Communautés Européennes
NSD	New service development
OCAI	Organizational culture assessment instrument
OECD	Organization for Economic Co-operation and Development
OI	Organizational innovativeness
PAM	Malaysia Institute of Architects'
PLS	Partial least squares
PLS-SEM	Partial-least squares-Structural Equation Modeling
PT	Process theory
R&D	Research and development
RBV	Resource-based view
ROA	Return on assets
ROE	Return on equity
SCI	Supply chain integration
SCM	Supply chain management
SDL	Service-dominant logic
SE	Standard error
SEM	Structural equation modeling

SME	Small and medium enterprise
SPSS	Statistical package for social science
UN	United Nation
VIF	Variance inflation factor



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